

C L A I M S

1. An electric motor characterized by comprising:

an armature core attached to a rotation shaft, having
5 plural teeth radially extending in radial directions, and plural
slots formed between teeth and extending along an axis
direction;

a commutator provided on the rotation shaft to be adjacent
to the armature core, with commutator members arranged in a
10 circumferential direction, the commutator members being equal in
number to the slots;

a first brush which slides on the commutator;

a second brush which is provided apart from the first brush
by a predetermined angle in a circumferential direction, and
15 slides on the commutator;

a third brush which slides on the commutator and is used
with either the first or second brush; and

an armature coil which is electrically connected between
adjacent ones of the commutator members, having a first coil
20 wound between given ones of the slots, and a second coil, which
is wound in an opposite direction to a direction of the first
coil between slots existing at positions point-symmetric to the
given ones of the slots with respect to a center of the rotation
shaft, the armature coil being configured such that when the
25 second brush contacts the adjacent ones of the commutator
members to short-circuit the first and second coils through the
second brush, the first and second coils exist at symmetric
positions with respect to an axis line extending through a

center of the second brush and the center of the rotation shaft.

2. The electric motor according to claim 1, characterized in that the first and second coils are connected in series with each other.

5 3. The electric motor according to claim 1 or 2, characterized in that the first and second coils are connected in parallel with each other.

4. The electric motor according to claim 1 or 2, characterized in that each of the first and second coils has a
10 main coil wound between two of the slots, and a subsidiary coil wound only along any one of the slots between which the main coil is wound.

5. The electric motor according to claim 4, characterized in that each of the main coils of the first and
15 second coils is wound by an equal number of turns around the armature core, and each of the subsidiary coils is wound on the armature core by 0.5 turns around the armature core.

6. The electric motor according to claim 4 or 5, characterized in that the subsidiary coils are formed between
20 the main coils of the first and second coils.

7. An electric motor characterized by comprising:
an armature core attached to a rotation shaft, having plural teeth radially extending in radial directions, and plural slots formed between teeth and extending along an axis
25 direction;

a commutator provided on the rotation shaft to be adjacent to the armature core, with commutator members arranged in a circumferential direction, the commutator members being equal in

number to the slots;

a first brush which slides on the commutator;

a second brush which is provided apart from the first brush
by a predetermined angle in a circumferential direction, and

5 slides on the commutator;

a third brush which slides on the commutator and is used
with either the first or second brush; and

an armature coil which is electrically connected between
adjacent ones of the commutator members, having a first coil
10 wound between given ones of the slots, and a second coil, which
is wound in an opposite direction to a direction of the first
coil between the same slots as the given ones of the slots, the
armature coil being configured such that when the second brush
contacts the adjacent ones of the commutator members to short-
15 circuit the first and second coils through the second brush, the
first and second coils exist on an axis line extending through a
center of the second brush and the center of the rotation shaft.

8. The electric motor according to any one of claims 1
to 7, characterized in that the slots are an even number of
20 slots not less than eight.